

II.—On Two New Species of *Pheretima* from Borneo. By W. MICHAELSEN, Hamburg.

THE following descriptions are based upon a small lot of Earthworms collected by Mr. T. C. Moulton, Director of the Sarawak Museum, at Mt. Poi, in Sarawak, North-west Borneo. The first species especially, which I name in honour of its collector, is of great interest on account of its curious habitus, which is not at all that of a *Pheretima* in general.

PHERETIMA MOULTONI, Michaelsen, n. sp.

Loc.—Borneo, Sarawak: Mt. Poi, 4000 ft. high, “curled up on a leaf” ; T. C. Moulton leg.

Present 3 mature specimens.

External Characters.—Dimensions: Length, 45–55 mm.; greatest thickness, 2–2½ mm.; number of segments about 93–100 (hinder end of all specimens regenerated).

Head tanylobous, prostomium small. Hinder appendix of prostomium nearly as broad as the prostomium, with parallel borders, which get somewhat less distinct at their hinder end.

Habitus nearly that of a terrestrial Planarian.

Body flattened ventrally, and even somewhat hollowed in the ventral median line.

Colour: Dorsal part of body-wall showing a very characteristic pigmentation, consisting of small dark violet-brown, nearly black, spots. Around the dorsal pores, which are distinguished as small circular white points (*viz.*, intersegmentally), a lot of such dark spots join in order to form a large irregularly bordered figure. At the anteclitellar part of the body these intersegmental figures get relatively larger and tend to join each other, and are forming there a complete moniliform median dorsal stripe. In the meantime the scattered spots diminish in number, and at about the tenth segment they vanish altogether. The median dark stripe is tapering from about the sixth segment forward, and is ending in a foremost, more or less isolated spot at the intersegmental furrow 1–2 or 2–3. The largest number of dark spots upon one segment is about twenty, without including the larger dark figure on the median dorsal line. The prime colour of the body-wall is light yellowish-grey.

Setæ very tender and numerous. I did not succeed in counting the setæ of one segment. Their number may be nearly one hundred. The rows of setæ are not interrupted ventrally, but irregularly interrupted for a small space dorsally. Dorsally the distances between two neighbouring setæ are increasing distinctly.

First dorsal pore at the intersegmental furrow 9-10.

Clitellum ring-shaped, but ventrally somewhat less distinct, constantly occupying the hinder third part of the thirteenth segment together with the whole fourteenth, fifteenth, and sixteenth segments ($= 3\frac{1}{3}$).

Male pores on the eighteenth segment on rather small circular porophors, distant from one another about $\frac{2}{5}-\frac{1}{4}$ of the whole circumference of the body.

Female pore unpaired, marked by a circular white spot, median ventrally upon the fore half of the fourteenth segment.

Spermathecal pores, three pairs upon the intersegmental furrows 4-5, 5-6, and 6-7. The two partners of one pair are distant from one another about one-third of the whole circumference of the body. The spermatal pores of the first pair are less distinct; those of the third pair are more distinct than those of the middle pair.

Accessory copulatory organs in general two pairs. Just before and behind each male pore, *i.e.*, at the fore part and at the hinder part of the eighteenth segment, but very little dislocated towards the median ventral line, there is seen a centrally depressed, sucker-like roundish papilla of about the same size as the male porophor. These papillæ are pushing back a little the frontiers of the eighteenth segment. In one specimen I found at the right side a supernumerary papilla of the same form just lateral from the normal one, and a little more lateral than the male porophor.

Internal Anatomy. — Septa all very tender, not one thickened, some before the ninth segment apparently failing.

Alimentary Tract: A moderately large longitudinal muscular gizzard before the first distinguishable septum, *viz.*, in the ninth or eighth segment, if not occupying both of them. Intestine without cæca.

Circulatory System: Dorsal vessel simple. Last heart in the thirteenth segment.

Excretory system micronephrical.

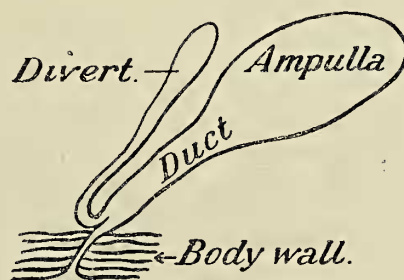
Anterior Male Organs: Two pairs of sperm duct funnels in the tenth and eleventh segment, each enclosed in a

large seminal vesicle. The seminal vesicles of the hinder pair in the eleventh segment are touching each other, as well as those of the first pair in the tenth segment, but they are nevertheless totally isolated. The seminal vesicles of the first pair seem to have a small communication with each other. Two pairs of irregular sac-like sperm sacs in the eleventh and twelfth segments, each sperm sac communicating with the seminal vesicle lying before it in the preceding segment.

Prostates: Glandular part large, occupying about five segments, somewhat longer than broad, with some very deep incisions and a great number of less deep incisions and furrows. Duct nearly straight, much shorter than the glandular part is broad; *in situ* totally hidden beneath the glandular part. The duct is opening directly; there is no copulatory pouch.

Spermathecæ of different sizes, those of the first pair smaller than those of the third pair and larger than the middle ones. Ampulla pear-shaped or sac-like. Duct much thinner than the ampulla, but nearly as long. The short extreme distal part piercing the body wall is abruptly much thinner. A single diverticulum opens into the duct of the main pouch just before it enters the body wall. The diverticula are tender, club-shaped, and of different lengths. Those of the hinder spermathecæ are nearly as long as the main pouch—at least distinctly longer than the ampulla; those of the first pair of spermathecæ are about as long as the duct of the ampulla. The distal end of the generally very tender stalk of the diverticula is a little thickened and sharply bent, opening in the direction from beneath to above into the duct of the ampulla.

Remarks.—This interesting little species of *Pheretima* is standing quite isolated in its genus on account of the



position of the spermathecal pores. The particular pigmentation and the singular shape of the body are giving to *P. Moultoni* a habitus quite uncommon in this genus.

PHERETIMA POIANA, n. sp.

Loc.—North Borneo, Sarawak: Mt. Poi, 3300 ft. high, under moss on a stone; T. C. Moulton leg.

Present one mature specimen.

External Characters.—Dimensions: Length, 290 mm.; thickness, 9 mm.; number of segments, 136.

Colour dorsally in general chestnut brown, with pale intersegmental furrows; at the fore end of the body slate-coloured.

Head epilobous (about $\frac{1}{2}$).

Setæ standing ventrally somewhat nearer together than dorsally; rows of setæ interrupted ventrally, irregularly, and for a short space interrupted dorsally. Number of setæ about: 50-v., 54-x., 57-xii., 52-xix., and 65-xxvi. Apparently no setæ on the clitellum.

First dorsal pore on the intersegmental furrow 12-13.

Clitellum ring-shaped, occupying the fourteenth to sixteenth segments (= 3), without setæ.

Male pores at the eighteenth segment about two-sevenths of the whole circumference of the body distant from one another, opposite to about the tenth seta from the medial ventral line. They are large transverse slits upon a rather large transversely oval porophor.

Female pore single and median, ventrally upon the fourteenth segment.

Spermathecal pores, three pairs upon the intersegmental furrows 6-7, 7-8, and 8-9, about in the lines of the eleventh seta from the median ventral line, those of one pair about $\frac{2}{5}$ of the whole circumference of the body distant from one another.

No accessory copulatory organs present.

Internal Anatomy.—The septa 7-8, 10-11, and 12-13 are rather strongly thickened, the septum 8-9 is wanting, and the septa 9-10 and 13-14 are a little thickened.

Alimentary Tract: A large gizzard between the septa 7-8 and 9-10. Intestine with very large cæca, which are stretching forward from the twenty-seventh segment as far as into the sixteenth segment. They are nearly simple, only slightly notched where piercing the septa; broad at the base, tapering towards the blind fore end.

Circulatory System: Dorsal vessel simple. Last hearts in the thirteenth segment.

Excretory system micronephric.

Anterior Male Organs: Two pairs of large, nearly globular, seminal vesicles in the tenth and eleventh seg-

ments, those of one side apparently being put into a small communication, those of one segment separated from one another. Two pairs of large sac-like sperm sacs in the eleventh and twelfth segments being connected each with the seminal vesicle lying just before and beneath in the preceding segment. Each large sperm sac bears dorsally a small appendix. A pair of smaller, grape-like supernumerary sperm sacs depend from the septum 12-13 into the thirteenth segment.

Prostates with rather small two-lobed glandular part, which occupies the sixteenth to twentieth segments. The surface of the glandular part is roughened by a net of furrows and more or less deep incisions. The duct is about as long as the glandular part, rather thick, bent in an S-like manner. It is opening into a large, nearly semi-globular, copulatory pouch.

Spermathecæ: Ampulla irregularly sac-like and thick. Duct about half as long as the ampulla, moderately thick, covered all over by nephridial tufts. A single diverticulum enters the duct of the ampulla at the point where it enters the body wall. The diverticulum consists of a short sausage-like sperm room about twice as long as thick, and a very tender, more or less strongly bent, stalk which is about as long as the sperm room, if not a little longer, and sharply set-off from the latter. In the whole, the diverticulum is somewhat shorter than the main pouch (ampulla + duct).

Remarks.—*Pheretima poiana* belongs to the group of *P. merabakensis*, Beddard & Fedarb,* *P. philippina*, Rosa,† *P. impudens*, Mich.,‡ and *P. bindjeyensis*, Mich.§ The new species is distinguished from *P. merabakensis* by the great distance between the male pores, which are said to be "close together" in *P. merabakensis*. In this character *P. merabakensis* seems to equal the *P. philippina*, in which the male pores are lying in the seventh or eighth row of setæ (of about thirty-five rows of setæ of one-half of a segment). I was able to examine a specimen from the Philippines which doubtless belongs to Rosa's species, and I can confirm this character. The distance between the centres of the slit-like male pores is relatively rather

* *Perichæta merabakensis*, Beddard & Fedarb, in Ann. Mag. Nat. Hist. (6) xvi. p. 72.

† *P. philippina*, Rosa, in Ann. Hofmus. Wien, vi. p. 397, pl. xiii. fig. 5.

‡ *Amyntas impudens*, Michaelsen, in Mt. Mus. Hamburg, xvi. p. 84, fig. 13.

§ *A. bindjeyensis*, Michaelsen, in Mt. Mus. Hamburg, xvi. p. 94, fig. 18.

small, equalling about one-fifth of the whole circumference. I may add, that in accordance with the position of the male pores in *P. philippina*, also the spermathecal pores of one pair are rather close together, viz., in the specimen examined by me, distant from one another about one-fifth of the whole circumference of the body in the zone of the pores. I suspect these two species, *P. philippina* and *P. merabahensis*, to be identical; but a definite statement can hardly be made without a re-examination of typical specimens of *P. merabahensis*.

Beddard* puts my *P. bindjeyensis* as a synonym to *P. philippina* of Rosa. This cannot be maintained. Beddard did not consider the great difference in the situation of the male pores and the spermathecal pores. This difference, indeed, is not easily to be conceived out of Rosa's and my modes of stating. In this character, *P. bindjeyensis* comes near the new species *P. poiana*. But *P. poiana* is a much larger form, differing from *P. bindjeyensis* by the shape of the spermathecal diverticula, by the shape of the sperm sacs, and by other characters of perhaps minor value.

From *P. impudens* as well, *P. poiana* is distinguished principally by the shape of the spermathecal diverticula.

* In Proc. Zool. Soc. London, 1900, p. 616.